

CLAIMS

WHAT IS CLAIMED IS:

1. A light source, comprising:
5 an LED that emits excitation light;
a layer of phosphor material positioned to receive the excitation light, the
phosphor material emitting visible light when illuminated with the
excitation light; and
a first non-planar flexible multilayer reflector that reflects the excitation light
10 and transmits visible light, the non-planar flexible multilayer reflector
being positioned to reflect LED light onto the phosphor material.
2. The light source according to claim 1, wherein the first non-planar flexible
multilayer reflector comprises polymeric material.
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3. The light source according to claim 1, wherein the first non-planar flexible
multilayer reflector comprises alternating layers of a first and second thermoplastic
polymer and wherein at least some of the layers are birefringent.
- 20 4. The light source according to claim 1, wherein the excitation light comprises
UV light.
5. The light source according to claim 1, wherein the first non-planar flexible
multilayer reflector is a concave flexible multilayer reflector.
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6. The light source according to claim 1, wherein the first non-planar flexible
multilayer reflector is a hemispherical concave flexible multilayer reflector.

7. The light source according to claim 1, wherein the layer of phosphor material is disposed between the LED and the non-planar flexible multilayer reflector.
8. The light source according to claim 1, wherein the first non-planar flexible
5 multilayer reflector has a non-uniform thickness.
9. The light source according to claim 8, wherein the first non-planar flexible multilayer reflector has a first thickness at an inner region of the first non-planar flexible multilayer reflector and a second thickness at an outer region of the first non-
10 planar flexible multilayer reflector and the first thickness is different than the second thickness.
10. The light source according to claim 9, wherein the first thickness is greater than the second thickness.
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11. The light source according to claim 9, wherein the first thickness is less than the second thickness.
12. The light source according to claim 2, wherein the polymeric material resists
20 degradation when exposed to UV light.
13. The light source according to claim 1, wherein the first non-planar flexible multilayer reflector is a polymeric material substantially free of inorganic materials.
- 25 14. The light source according to claim 1, wherein the layer of phosphor material is a discontinuous layer of phosphor material.
15. The light source according to claim 1, wherein the layer of phosphor material is a plurality of dots of phosphor material.

16. The light source according to claim 1, wherein each dot has an area of less than 10000 microns².
- 5 17. The light source according to claim 15, wherein the plurality of dots comprise phosphor material that emit red, green and blue light when illuminated with excitation light.
- 10 18. The light source according to claim 1, further comprising:
a second multilayer reflector that reflects visible light and transmits the
excitation light disposed between the LED and the phosphor material.
- 15 19. The light source according to claim 18, wherein the second multilayer reflector comprises polymeric material.
- 20 20. The light source according to claim 1, wherein the second multilayer reflector comprises alternating layers of a first and second thermoplastic polymer and wherein at least some of the layers are birefringent.
- 21 21. The light source according to claim 18, wherein the first flexible multilayer reflector is a first concave polymeric multilayer reflector.
- 25 22. The light source according to claim 18, wherein the second multilayer reflector is a second concave polymeric multilayer reflector.
23. The light source according to claim 18, wherein the first flexible multilayer reflector is a first hemispherical concave polymeric multilayer reflector.

24. The light source according to claim 18, wherein the second multilayer reflector is a second hemispherical concave polymeric multilayer reflector.
25. The light source according to claim 18, wherein the first flexible multilayer reflector comprises a polymeric material that resists degradation when exposed to UV light and the second multilayer reflector comprises a polymeric material that resists degradation when exposed to UV light.
26. The light source according to claim 18, wherein the first flexible multilayer reflector is formed of a polymeric material substantially free of inorganic materials and the second multilayer reflector is formed of a polymeric material substantially free of inorganic materials.
27. The light source according to claim 18, wherein the first flexible multilayer reflector is a first hemispherical concave polymeric multilayer reflector and the second multilayer reflector is a second hemispherical concave polymeric multilayer reflector.
28. The light source according to claim 27, wherein the layer of phosphor material is disposed between the first hemispherical concave polymeric multilayer reflector and the second hemispherical concave polymeric multilayer reflector.
29. The light source according to claim 18, wherein the layer of phosphor material is a discontinuous layer of phosphor material.
30. The light source according to claim 29, wherein the layer of phosphor material is a plurality of dots of phosphor material.
31. The light source according to claim 30, wherein each dot has an area of less than 10000 microns².

32. The light source according to claim 30, wherein the plurality of dots comprise phosphor material that emit red, green and blue light when illuminated with excitation light.

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33. The light source according to claim 17, wherein at least a first phosphor dot emits light at a first wavelength and a second phosphor dot emits light at a second wavelength different than the first wavelength.

10 34. A method of manufacturing a light source, comprising the steps of:
providing a LED that emits excitation light;
positioning a layer of phosphor material such that the phosphor material emits
visible light when illuminated with the excitation light; and
positioning a non-planar flexible multilayer reflector to reflect excitation light
15 onto the phosphor material and transmits visible light.

35. The method according to claim 34, wherein the step of positioning a non-planar flexible multilayer reflector comprises positioning a non-planar polymeric multilayer reflector to reflect excitation light.

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36. The method according to claim 34, wherein the step of positioning a non-planar flexible multilayer reflector comprises positioning a non-planar flexible multilayer reflector having alternating layers of a first and second thermoplastic polymer and wherein at least some of the layers are birefringent.

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37. The method according to claim 34, further comprising the step of shaping the non-planar flexible multilayer reflector to form a non-planar polymeric multilayer reflector.

38. The method according to claim 35, further comprising the step of thermoforming the polymeric multilayer reflector to form a non-planar polymeric multilayer reflector.
- 5 39. The method according to claim 34, further comprising the step of patterning a discontinuous layer of phosphor material such that the phosphor material emits visible light when illuminated with the excitation light.